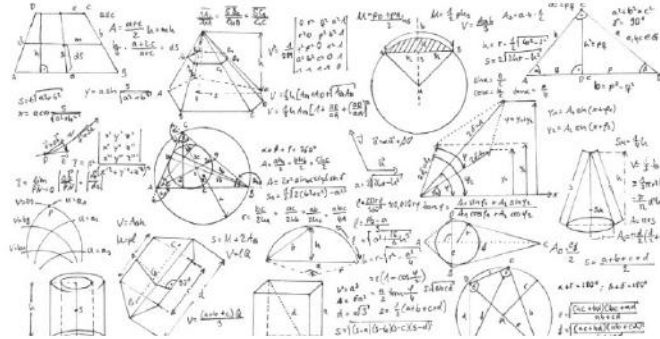# Major in Mathematics (pure); Major in Mathematics — Applied Science

Department of Mathematics
University of California, San Diego

2016-10-10 (updated 2016-11-17)

General Information

- For additional Department of Mathematics assistance:

  SOPHIA ONWUCHEKWA (AP&M 7409), Student Affairs Assistant

  HOLLY PROUDFOOT (AP&M 7409), Director of Instructional Support

  JEFFREY SAIKALI (AP&M 7431), Undergraduate Advisor

- Advisor walk-in hours at math.ucsd.edu. (Hours subject to change).

- Email mathadvising@math.ucsd.edu or the Virtual Advising Center, vac.ucsd.edu, for simple questions not needing in-person meeting. In all communication, you must mention *in the body of your message* **(1) your full name of record, (2) your** PID, **and (3) your major.**

- *Note: The official authority for curricula of degree programs at* UC *San Diego is the General Catalog at catalog.ucsd.edu.*

2

Major in Mathematics
(Major code: MA 29)

- Major is also known as "pure mathematics"

- Can be used as *partial preparation* for…

  (1) Studying mathematics in graduate school and then…

   (a) working in industry

   (b) teaching in community college or liberal arts college

   (c) becoming university faculty member

  (2) Earning teacher credential for teaching mathematics in high school or below

3

Major in Mathematics
Curriculum (lower division)

- Calculus and linear algebra: MATH 20A-B-C-D-E and MATH 18 (formerly MATH 20F)

  OR

- Honors calculus and linear algebra: MATH 31AH-BH-CH and MATH 20D

4

Major in Mathematics
Curriculum (upper division)

- Mathematical Reasoning (MATH 109)

- Analysis:
  - Foundations of Real Analysis (MATH 140A-B) OR
  - Introduction to Analysis (MATH 142A-B) and Elements of Complex Analysis (MATH 120A)

  For graduate school preparation, MATH 140A-B-C highly recommended

- Algebra:
  - Abstract Algebra (MATH 100A-B) OR
  - Modern Applied Algebra (MATH 103A-B) and Applied Linear Algebra (MATH 102)

  For graduate school preparation, MATH 100A-B-C highly recommended

5

Major in Mathematics
Curriculum (upper division) continued

- 13 four-unit upper division courses in total required

- After aforementioned courses in analysis and algebra, need 7 to 9 additional upper division mathematics courses

- One idea: Use additional courses to focus degree on one or two of…

  Probability/statistics (180 sequence, 181 sequence)
  Differential equations (110 sequence, 130 sequence)
  Numerical analysis (170, sequence, 171 sequence, 174, 175, 179)
  Geometry/graphics (150 sequence, 155A)

- Could instead take 7 to 9 random upper division mathematics courses, but this would imply lack of focus

6

Major in Mathematics
Summary

- Offers lots of variability in curriculum

- Could use "Major in Mathematics" to match some other mathematics degree curriculum if preference is to have degree saying *Mathematics* as major

- Example: If you ultimately want to teach in community college, having undergraduate degree in pure mathematics is ideal undergraduate component of qualifications

7

Final Thoughts

- Taking more upper division courses now in an area or two of mathematics of interest to you could strengthen a future application to graduate school

- If you can do very well in them, taking graduate level courses in an area or two of mathematics now could also enhance a future application to graduate school

- The Department of Mathematics Honors Program is a great way to engage in research as an undergraduate student. See http://www.math.ucsd.edu/programs/undergraduate/. Producing impressive work in an honors project as an undergraduate student could greatly benefit you if applying to graduate school.

8

Major in
Mathematics — Applied Science
(Major code: MA 31)

- Major is for people who want upper division coursework as…
  50% mathematics +
  50% applied science from 1 or 2 other departments

- This is effectively a joint major, which is like two half majors. It provides a partial foundation in mathematics and one or two sciences. (It is sometimes used by people who want to double major in it and something else if they can count 4 four-unit upper division courses toward both majors.) There are varying opinions on how this major stands on its own as preparation for employment without a student also completing a meaningful internship or research project or going to graduate school.

9

Major in
Mathematics — Applied Science
Curriculum (lower division)

- Calculus and linear algebra: MATH 20A-B-C-D-E and MATH 18 (formerly MATH 20F)

  OR

- Honors calculus and linear algebra: MATH 31AH-BH-CH and MATH 20D

- Also need one of…
  CSE 8A-B (Introduction to computer science; Java) OR
  CSE 11 (Introduction to computer science; Java, accelerated pace) OR
  ECE 15 (Engineering computation)

10

Major in
Mathematics—Applied Science
Curriculum (upper division mathematics courses)

- Mathematical Reasoning (MATH 109)

- Linear Algebra (MATH 102 or 170A)

- Analysis sequence:
  Foundations of Real Analysis (MATH 140A-B) OR
  Introduction to Analysis (MATH 142A-B)

- Any two-quarter, upper division mathematics sequence

- Upper division electives to complete at least 7 four-unit mathematics courses of student's choosing

11

Major in
Mathematics—Applied Science
Curriculum (upper division applied science courses)

- Need 7 additional upper division courses (28 units) from one or two departments other than mathematics

- Examples of departments offering acceptable courses: Physics, chemistry and biochemistry, biology, engineering (any branch), computer science, cognitive science, economics, management science

- At least 3 of the 7 courses need calculus as prerequisite

- *All non-mathematics coursework must be approved by an advisor and your DARS audit adjusted accordingly*

12

Final Thoughts

- Choose major not based only on what seems interesting, but on what realistically will help you reach career goals

- Learn all you can now from people in your industry of interest about career you aspire to

- Look for job advertisements at companies in your field of interest; what major/degree qualifications are expected?

- Make the most of your time as a student. Get to know your professors, teachings assistants, and advisors. Establish excellent reputations with them.

13